



Maths Calculation Policy: Multiplication

The following pages show the *Power Maths White Rose Edition* progression in multiplication and how this works in line with the National Curriculum. The consistent use of the CPA (concrete, pictorial, abstract) approach across *Power Maths White Rose Edition* helps children develop mastery across all the operations in an efficient and reliable way. This policy shows how these methods develop children's confidence in their understanding of both written and mental methods.

RECEPTION

Children develop the core ideas that underpin all calculation. They begin by connecting calculation with counting on and counting back, but they should learn that understanding wholes and parts will enable them to calculate efficiently and accurately, and with greater flexibility. Children record their calculations in their own ways, there is no expectation of number sentences at this stage; however children may choose this way to record their thinking.

Key language: , group, share, equal, equals, is equal to, groups, equal groups, divide, share, shared equally

Multiplication:

Children first start to look at the idea of equal groups through their exploration of doubles. They use five frames and objects to check that groups are equal. Children then explore halving numbers by making two equal groups. They highlight patterns between doubling and halving seeing that double 2 is 4 and half of 4 is 2.

As well as halving, children also explore sharing into more than two equal groups. They share objects one by one, ensuring that each group has an equal share..

KEY STAGE 1

Children develop the core ideas that underpin all calculation. They begin by connecting calculation with counting on and counting back, but they should learn that understanding wholes and parts will enable them to calculate efficiently and accurately, and with greater flexibility. They learn how to use an understanding of 10s and 1s to develop their calculation strategies, especially in addition.

Key language: group, share, equal, equals, is equal to, groups, equal groups, times, multiply, multiplied by, divide, share, shared equally, times-table

Multiplication: Children develop an awareness of equal groups and link this with counting in equal steps, starting with 2s, 5s and 10s. In Year 2, they learn to connect the language of equal groups with the mathematical symbols for multiplication and division.

They learn how multiplication and division can be related to repeated addition and repeated subtraction to find the answer to the calculation. In this key stage, it is vital that children explore and experience a variety of strong images and manipulative representations of equal groups, including concrete experiences as well as abstract calculations.

Children begin to recall some key multiplication facts, including doubles, and an understanding of the 2, 5 and 10 times-tables and how they are related to counting.

LOWER KEY STAGE 2

Key language: whole, part, equal groups, sharing, grouping, bar model

Multiplication: Children build a solid grounding in times-tables, understanding the multiplication and division facts in tandem. As such, they should be as confident knowing that 35 divided by 7 is 5 as knowing that 5 times 7 is 35.

Children develop key skills to support multiplication methods: unitising, commutativity, and how to use partitioning effectively.

Unitising allows children to use known facts to multiply and divide multiples of 10 and 100 efficiently. Commutativity gives children flexibility in applying known facts to calculations and problem solving. An understanding of partitioning allows children to extend their skills to multiplying and dividing 2- and 3-digit numbers by a single digit.

Children develop column methods to support multiplications in these cases.

For successful division, children will need to make choices about how to partition. For example, to divide 423 by 3, it is effective to partition 423 into 300, 120 and 3, as these can be divided by 3 using known facts.

Children will also need to understand the concept of remainder, in terms of a given calculation and in terms of the context of the problem.

UPPER KEY STAGE 2

Key language: factor, multiple, prime number, square number, cube number


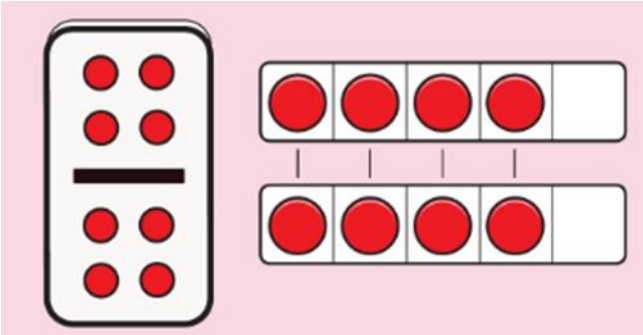
Building on their understanding, children develop methods to multiply up to 4-digit numbers by single-digit and 2-digit numbers.

Children develop column methods with an understanding of place value, and they continue to use the key skill of unitising to multiply and divide by 10, 100 and 1,000.





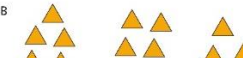

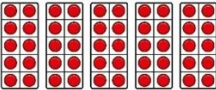
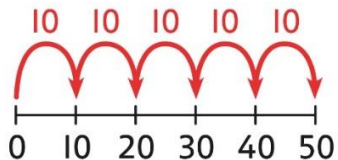
Written division methods are introduced and adapted for division by single-digit and 2-digit numbers and are understood alongside the area model and place value. In Year 6, children develop a secure understanding of how division is related to fractions.

Multiplication and division of decimals are also introduced and refined in Year 6.


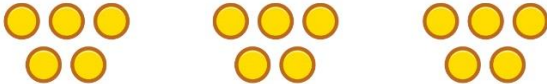
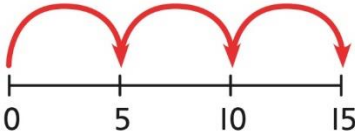

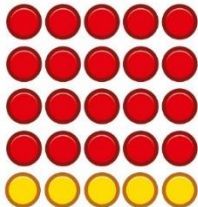
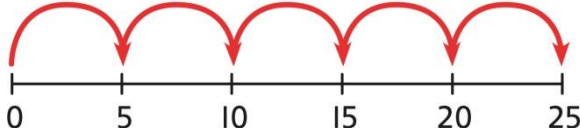

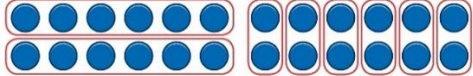

Reception


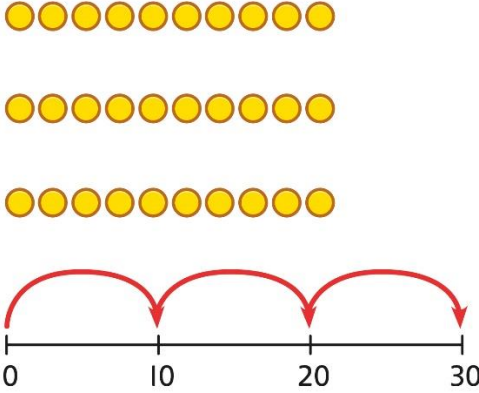
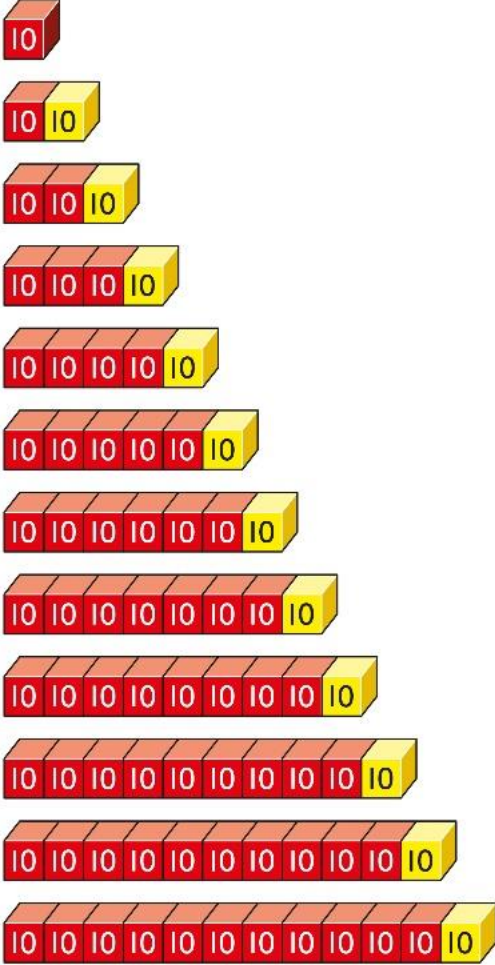
	Real-life representation	Other representations
Multiplication	<p>Making doubles</p> <p>Children explore doubles in their environment including in games such as on dominoes or dice. They focus on the understanding of doubles being 2 equal groups.</p>  <p><i>Double 4 is 8. Double 2 is 4. Double 3 is 6.</i></p>	<p>Making doubles</p> <p>Children use five frames to find doubles by lining up counters or cubes.</p>  <p><i>Double 4 is 8.</i></p>

Year 1

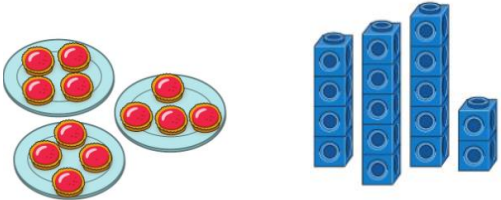

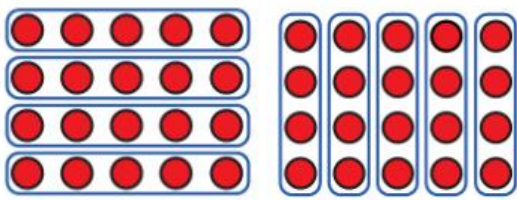
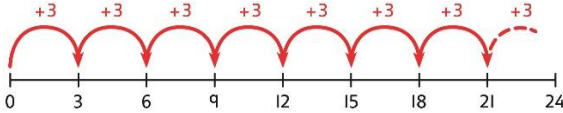
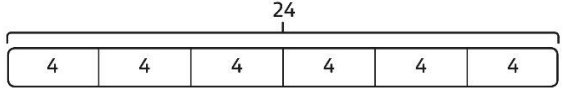
	Concrete	Pictorial	Abstract																																																		
Year 1 Multiplication																																																					
Recognising and making equal groups	<p>Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.</p> <p>A  B  C </p>	<p>Children draw and represent equal and unequal groups.</p> <p>A  B </p>	<p>Three equal groups of 4. Four equal groups of 3.</p>																																																		
Finding the total of equal groups by counting in 2s, 5s and 10s	<p></p> <p>There are 5 pens in each pack ... 5...10...15...20...25...30...35...40...</p>	<p>100 squares and ten frames support counting in 2s, 5s and 10s.</p> <p></p> <table border="1" data-bbox="958 740 1218 874"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	<p>Use a number line to support repeated addition through counting in 2s, 5s and 10s.</p> <p></p>
1	2	3	4	5	6	7	8	9	10																																												
11	12	13	14	15	16	17	18	19	20																																												
21	22	23	24	25	26	27	28	29	30																																												
31	32	33	34	35	36	37	38	39	40																																												
41	42	43	44	45	46	47	48	49	50																																												

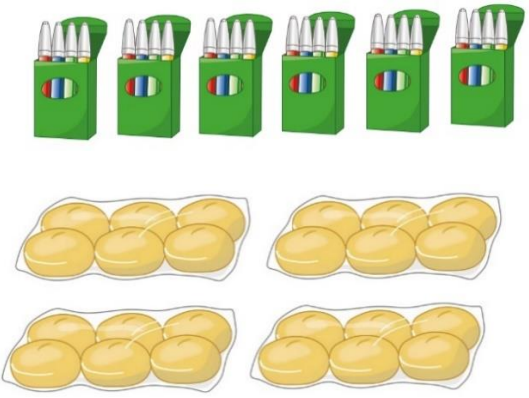
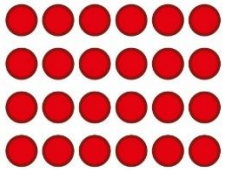

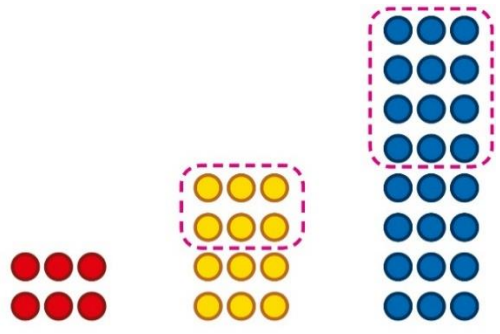
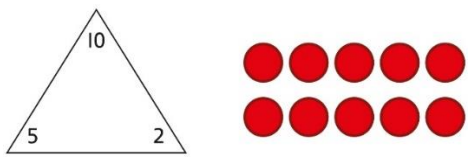
Year 2

	Concrete	Pictorial	Abstract
Year 2 Multiplication			
Equal groups and repeated addition	<p>Recognise equal groups and write as repeated addition and as multiplication.</p>  <p><i>3 groups of 5 chairs 15 chairs altogether</i></p>	<p>Recognise equal groups using standard objects such as counters and write as repeated addition and multiplication.</p>  <p><i>3 groups of 5 15 in total</i></p>	<p>Use a number line and write as repeated addition and as multiplication.</p>  <p>$5 + 5 + 5 = 15$ $3 \times 5 = 15$</p>
Using arrays to represent multiplication and support understanding	<p>Understand the relationship between arrays, multiplication and repeated addition.</p>  <p><i>4 groups of 5</i></p>	<p>Understand the relationship between arrays, multiplication and repeated addition.</p>  <p><i>4 groups of 5 ... 5 groups of 5</i></p>	<p>Understand the relationship between arrays, multiplication and repeated addition.</p>  <p>$5 \times 5 = 25$</p>
Understanding commutativity	<p>Use arrays to visualise commutativity.</p>  <p><i>I can see 6 groups of 3. I can see 3 groups of 6.</i></p>	<p>Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication.</p>  <p><i>This is 2 groups of 6 and also 6 groups of 2.</i></p>	<p>Use arrays to visualise commutativity.</p>  <p>$4 + 4 + 4 + 4 + 4 = 20$ $5 + 5 + 5 + 5 = 20$</p>

<p>Learning $\times 2$, $\times 5$ and $\times 10$ table facts</p>	<p>Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.</p>  <p>3 groups of 10 ... 10, 20, 30 $3 \times 10 = 30$</p>	<p>Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.</p>  <p>$10 + 10 + 10 = 30$ $3 \times 10 = 30$</p>	<p>$4 \times 5 = 20$ and $5 \times 4 = 20$</p> <p>Understand how the times-tables increase and contain patterns.</p>  <p>$5 \times 10 = 50$ $6 \times 10 = 60$</p>
--	--	---	---

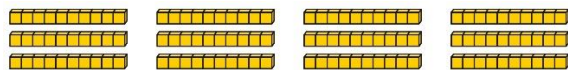
Year 3

	Concrete	Pictorial	Abstract
Year 3 Multiplication			
Understanding equal grouping and repeated addition	<p>Children continue to build understanding of equal groups and the relationship with repeated addition. They recognise both examples and non-examples using objects.</p>  <p>Children recognise that arrays can be used to model commutative multiplications.</p>  <p><i>I can see 3 groups of 8. I can see 8 groups of 3.</i></p>	<p>Children recognise that arrays demonstrate commutativity.</p>  <p><i>This is 3 groups of 4. This is 4 groups of 3.</i></p>	<p>Children understand the link between repeated addition and multiplication.</p>  <p><i>8 groups of 3 is 24.</i></p> <p>$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24$ $8 \times 3 = 24$</p> <p>A bar model may represent multiplications as equal groups.</p>  <p>$6 \times 4 = 24$</p>
Using commutativity to support understanding of the times-tables	<p>Understand how to use times-tables facts flexibly.</p>	<p>Understand how times-table facts relate to commutativity.</p>	<p>Understand how times-table facts relate to commutativity.</p> <p><i>I need to work out 4 groups of 7.</i></p> <p><i>I know that $7 \times 4 = 28$</i></p>

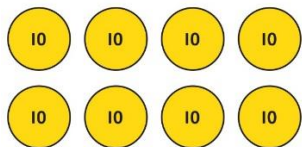
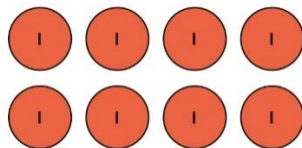
	 <p>There are 6 groups of 4 pens. There are 4 groups of 6 bread rolls.</p> <p>I can use $6 \times 4 = 24$ to work out both totals.</p>	 <p>$6 \times 4 = 24$ $4 \times 6 = 24$</p>	<p>so, I know that</p> <p>4 groups of 7 = 28 and 7 groups of 4 = 28.</p>
<p>Understanding and using $\times 3$, $\times 2$, $\times 4$ and $\times 8$ tables.</p>	<p>Children learn the times-tables as 'groups of' but apply their knowledge of commutativity.</p>  <p>I can use the $\times 3$ table to work out how many keys. I can also use the $\times 3$ table to work out how many batteries.</p>	<p>Children understand how the $\times 2$, $\times 4$ and $\times 8$ tables are related through repeated doubling.</p>  <p>$3 \times 2 = 6$ $3 \times 4 = 12$ $3 \times 8 = 24$</p>	<p>Children understand the relationship between related multiplication and division facts in known times-tables.</p>  <p>$2 \times 5 = 10$ $5 \times 2 = 10$ $10 \div 5 = 2$ $10 \div 2 = 5$</p>
<p>Using known facts to multiply 10s, for example 3×40</p>	<p>Explore the relationship between known times-tables and multiples of 10 using place value equipment.</p> <p>Make 4 groups of 3 ones.</p>	<p>Understand how unitising 10s supports multiplying by multiples of 10.</p>	<p>Understand how to use known times-tables to multiply multiples of 10.</p>



Make 4 groups of 3 tens.



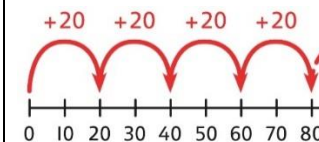
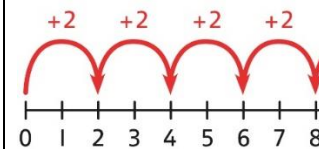
What is the same?
What is different?



4 groups of 2 ones is 8 ones.
4 groups of 2 tens is 8 tens.

$$4 \times 2 = 8$$

$$4 \times 20 = 80$$



$$4 \times 2 = 8$$

$$4 \times 20 = 80$$

Multiplying a 2-digit number by a 1-digit number

Understand how to link partitioning a 2-digit number with multiplying.

Each person has 23 flowers.

Each person has 2 tens and 3 ones.



There are 3 groups of 2 tens.

There are 3 groups of 3 ones.

Use place value equipment to model the multiplication context.

Use place value to support how partitioning is linked with multiplying by a 2-digit number.

$$3 \times 24 = ?$$

T	O

$$3 \times 4 = 12$$

T	O

Use addition to complete multiplications of 2-digit numbers by a 1-digit number.

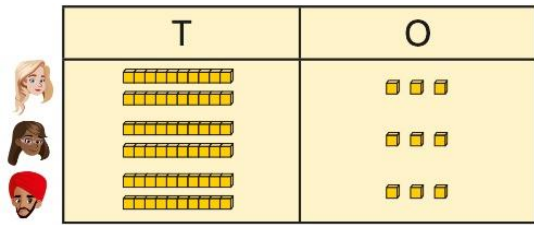
$$4 \times 13 = ?$$

$$4 \times 3 = 12$$

$$4 \times 10 = 40$$

$$12 + 40 = 52$$

$$4 \times 13 = 52$$



There are 3 groups of 3 ones.

There are 3 groups of 2 tens.

$$3 \times 20 = 60$$

$$60 + 12 = 72$$

$$3 \times 24 = 72$$

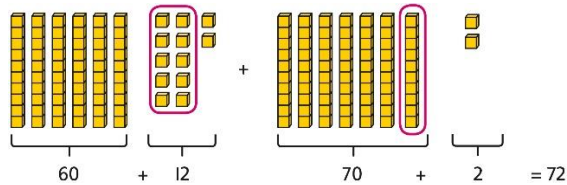
Multiplying a 2-digit number by a 1-digit number, expanded column method

Use place value equipment to model how 10 ones are exchanged for a 10 in some multiplications.

$$3 \times 24 = ?$$

$$3 \times 20 = 60$$

$$3 \times 4 = 12$$



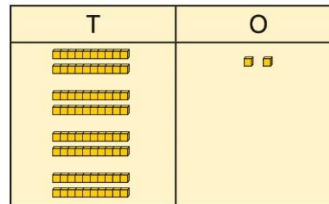
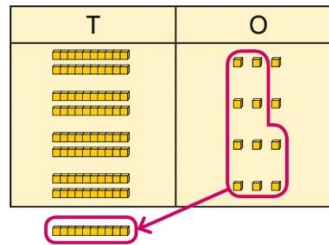
$$3 \times 24 = 60 + 12$$

$$3 \times 24 = 70 + 2$$

$$3 \times 24 = 72$$

Understand that multiplications may require an exchange of 1s for 10s, and also 10s for 100s.

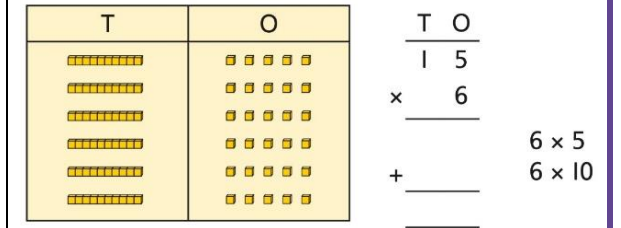
$$4 \times 23 = ?$$



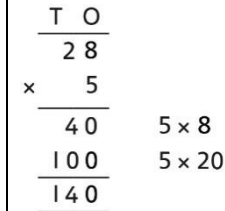
$$4 \times 23 = 92$$











Children may write calculations in expanded column form, but must understand the link with place value and exchange.

Children are encouraged to write the expanded parts of the calculation separately.



$$5 \times 28 = ?$$



T	O
	
	
	
	
	

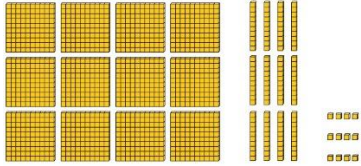
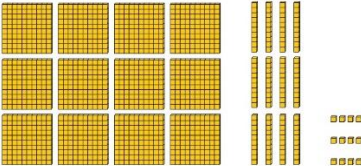

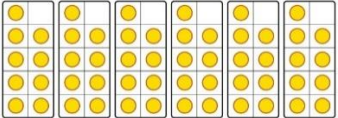


$$5 \times 23 = ?$$

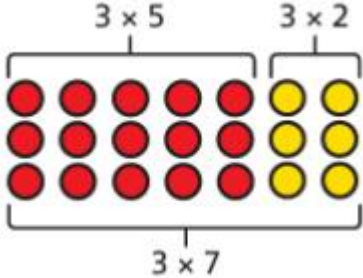
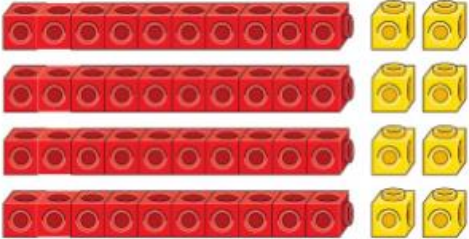
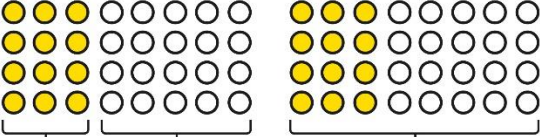
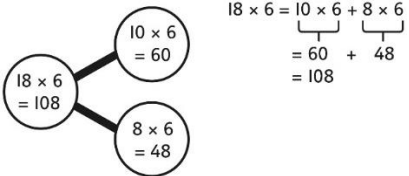
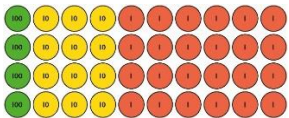
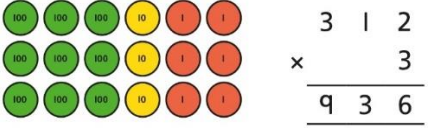
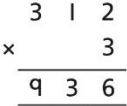
$$5 \times 3 = 15$$

$$5 \times 20 = 100$$

$$5 \times 23 = 115$$

Year 4

	Concrete	Pictorial	Abstract
Year 4 Multiplication			
Multiplying by multiples of 10 and 100	<p>Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.</p>  <p>3 groups of 4 ones is 12 ones. 3 groups of 4 tens is 12 tens. 3 groups of 4 hundreds is 12 hundreds.</p>	<p>Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.</p>  <p>$3 \times 4 = 12$ $3 \times 40 = 120$ $3 \times 400 = 1,200$</p>	<p>Use known facts and understanding of place value and commutativity to multiply mentally.</p> <p>$4 \times 7 = 28$ $4 \times 70 = 280$ $40 \times 7 = 280$ $4 \times 700 = 2,800$ $400 \times 7 = 2,800$</p>
Understanding times-tables up to 12×12	<p>Understand the special cases of multiplying by 1 and 0.</p>  <p>$5 \times 1 = 5$ $5 \times 0 = 0$</p>	<p>Represent the relationship between the $\times 9$ table and the $\times 10$ table.</p>  <p>Represent the $\times 11$ table and $\times 12$ tables in relation to the $\times 10$ table.</p>  <p>$2 \times 11 = 20 + 2$ $3 \times 11 = 30 + 3$ $4 \times 11 = 40 + 4$</p>  <p>$4 \times 12 = 40 + 8$</p>	<p>Understand how times-tables relate to counting patterns.</p> <p>Understand links between the $\times 3$ table, $\times 6$ table and $\times 9$ table <i>5 x 6 is double 5 x 3</i></p> <p>$\times 5$ table and $\times 6$ table <i>I know that $7 \times 5 = 35$ so I know that $7 \times 6 = 35 + 7$.</i></p> <p>$\times 5$ table and $\times 7$ table $3 \times 7 = 3 \times 5 + 3 \times 2$</p>

			 <p>3×5 3×2</p> <p>3×7</p> <p>$\times 9$ table and $\times 10$ table $6 \times 10 = 60$ $6 \times 9 = 60 - 6$</p>
<p>Understanding and using partitioning in multiplication</p>	<p>Make multiplications by partitioning. 4×12 is 4 groups of 10 and 4 groups of 2.</p>  <p>$4 \times 12 = 40 + 8$</p>	<p>Understand how multiplication and partitioning are related through addition.</p>  <p>$4 \times 3 = 12$ $4 \times 5 = 20$ $4 \times 8 = 32$</p> <p>$4 \times 3 = 12$ $4 \times 5 = 20$ $12 + 20 = 32$</p> <p>$4 \times 8 = 32$</p>	<p>Use partitioning to multiply 2-digit numbers by a single digit.</p> <p>$18 \times 6 = ?$</p>  <p>$18 \times 6 = 10 \times 6 + 8 \times 6$ $= 60 + 48$ $= 108$</p>
<p>Column multiplication for 2- and 3-digit numbers multiplied by a single digit</p>	<p>Use place value equipment to make multiplications.</p> <p>Make 4×136 using equipment.</p>  <p>I can work out how many 1s, 10s and 100s.</p>	<p>Use place value equipment alongside a column method for multiplication of up to 3-digit numbers by a single digit.</p>  <p>$3 \mid 2$ $\times \quad 3$ $\hline 9 \ 3 \ 6$</p>	<p>Use the formal column method for up to 3-digit numbers multiplied by a single digit.</p>  <p>Understand how the expanded column method is related to the formal column method and understand how any</p>

There are 4×6 ones... 24 ones
 There are 4×3 tens ... 12 tens
 There are 4×1 hundreds ... 4 hundreds

$$24 + 120 + 400 = 544$$

exchanges are related to place value at each stage of the calculation.

$$\begin{array}{r} 23 \\ \times 5 \\ \hline 115 \end{array}$$

$$\begin{array}{r} 23 \\ \times 5 \\ \hline 115 \\ \hline \end{array}$$

Multiplying more than two numbers

Represent situations by multiplying three numbers together.



Each sheet has 2×5 stickers.
 There are 3 sheets.

There are $5 \times 2 \times 3$ stickers in total.

$$5 \times 2 \times 3 = 30$$

$$\underbrace{5 \times 2}_{10} \times 3 = 30$$

$$10 \times 3 = 30$$

Understand that commutativity can be used to multiply in different orders.



$$2 \times 6 \times 10 = 120$$

$$12 \times 10 = 120$$

$$10 \times 6 \times 2 = 120$$

$$60 \times 2 = 120$$

Use knowledge of factors to simplify some multiplications.

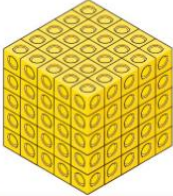
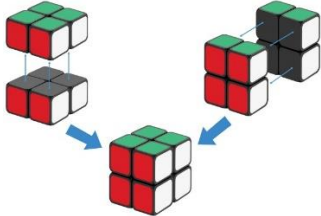
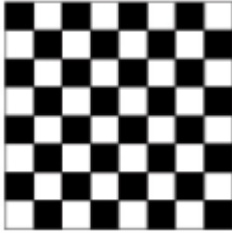
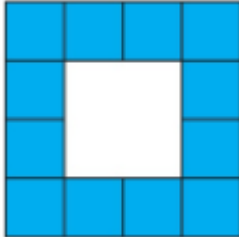


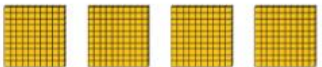


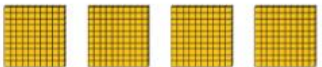
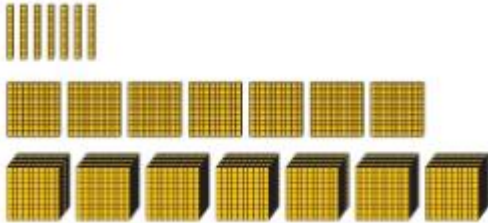


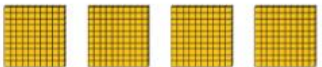
$$24 \times 5 = 12 \times 2 \times 5$$

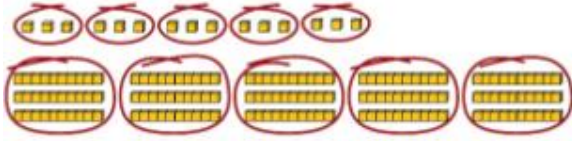
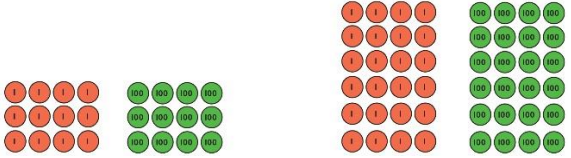
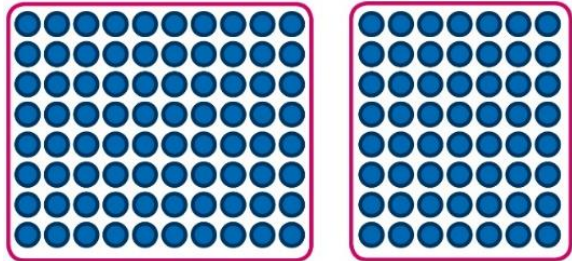
$$12 \times 2 \times 5 =$$

$$\underbrace{12 \times 2}_{12} \times 5 = 120$$

$$\text{So, } 24 \times 5 = 120$$

Year 5

	Concrete	Pictorial	Abstract												
Year 5 Multiplication															
Understanding factors	<p>Use cubes or counters to explore the meaning of 'square numbers'.</p> <p><i>25 is a square number because it is made from 5 rows of 5.</i></p>  <p>Use cubes to explore cube numbers.</p>  <p>8 is a cube number.</p>	<p>Use images to explore examples and non-examples of square numbers.</p>  <p>$8 \times 8 = 64$ $8^2 = 64$</p>  <p><i>12 is not a square number, because you cannot multiply a whole number by itself to make 12.</i></p>	<p>Understand the pattern of square numbers in the multiplication tables.</p> <p><i>Use a multiplication grid to circle each square number. Can children spot a pattern?</i></p>												
Multiplying by 10, 100 and 1,000	<p>Use place value equipment to multiply by 10, 100 and 1,000 by unitising.</p> <table border="1" data-bbox="353 1246 920 1418"> <tr> <td>$4 \times 1 = 4$ ones = 4</td> <td></td> </tr> <tr> <td>$4 \times 10 = 4$ tens = 40</td> <td></td> </tr> <tr> <td>$4 \times 100 = 4$ hundreds = 400</td> <td></td> </tr> </table>	$4 \times 1 = 4$ ones = 4		$4 \times 10 = 4$ tens = 40		$4 \times 100 = 4$ hundreds = 400		<p>Understand the effect of repeated multiplication by 10.</p> 	<p>Understand how exchange relates to the digits when multiplying by 10, 100 and 1,000.</p> <table border="1" data-bbox="1559 1270 1935 1402"> <thead> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>7</td> </tr> </tbody> </table> <p>$17 \times 10 = 170$</p>	H	T	O		1	7
$4 \times 1 = 4$ ones = 4															
$4 \times 10 = 4$ tens = 40															
$4 \times 100 = 4$ hundreds = 400															
H	T	O													
	1	7													

		$7 \times 10 = 70$ $7 \times 100 = 7,000$ $7 \times 1,000 = 70,000$	$17 \times 100 = 17 \times 10 \times 10 = 1,700$ $17 \times 1,000 = 17 \times 10 \times 10 \times 10 = 17,000$																																
Multiplying by multiples of 10, 100 and 1,000	<p>Use place value equipment to explore multiplying by unitising.</p>  <p>5 groups of 3 ones is 15 ones. 5 groups of 3 tens is 15 tens.</p> <p>So, I know that 5 groups of 3 thousands would be 15 thousands.</p>	<p>Use place value equipment to represent how to multiply by multiples of 10, 100 and 1,000.</p>  <p> $4 \times 3 = 12$ $4 \times 300 = 1,200$ </p> <p> $6 \times 4 = 24$ $6 \times 400 = 2,400$ </p>	<p>Use known facts and unitising to multiply.</p> <p> $5 \times 4 = 20$ $5 \times 40 = 200$ $5 \times 400 = 2,000$ $5 \times 4,000 = 20,000$ </p> <p>$5,000 \times 4 = 20,000$</p>																																
Multiplying up to 4-digit numbers by a single digit	<p>Explore how to use partitioning to multiply efficiently.</p> <p>$8 \times 17 = ?$</p>  <p> $8 \times 10 = 80$ $8 \times 7 = 56$ </p> <p>$80 + 56 = 136$</p> <p>So, $8 \times 17 = 136$</p>	<p>Represent multiplications using place value equipment and add the 1s, then 10s, then 100s, then 1,000s.</p> <table border="1" data-bbox="958 928 1406 1340"> <thead> <tr> <th></th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>1000</td> <td></td> <td></td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10 10</td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10 10</td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10 10</td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10 10</td> <td>1 1 1</td> </tr> </tbody> </table>		H	T	O	1000			1 1 1	100		10 10 10 10 10 10	1 1 1	100		10 10 10 10 10 10	1 1 1	100		10 10 10 10 10 10	1 1 1	100		10 10 10 10 10 10	1 1 1	<p>Use an area model and then add the parts.</p> <table border="1" data-bbox="1572 887 2123 967"> <thead> <tr> <th></th> <th>100</th> <th>60</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>$100 \times 5 = 500$</td> <td>$60 \times 5 = 300$</td> <td>$3 \times 5 = 15$</td> </tr> </tbody> </table> <p>Use a column multiplication, including any required exchanges.</p> $\begin{array}{r} 136 \\ \times \quad 6 \\ \hline 816 \\ \underline{2\ 3} \end{array}$		100	60	3	5	$100 \times 5 = 500$	$60 \times 5 = 300$	$3 \times 5 = 15$
	H	T	O																																
1000			1 1 1																																
100		10 10 10 10 10 10	1 1 1																																
100		10 10 10 10 10 10	1 1 1																																
100		10 10 10 10 10 10	1 1 1																																
100		10 10 10 10 10 10	1 1 1																																
	100	60	3																																
5	$100 \times 5 = 500$	$60 \times 5 = 300$	$3 \times 5 = 15$																																

			$\begin{array}{r} 1\ 2\ 7\ 4 \\ \times \quad 3\ 2 \\ \hline 2\ 5\ 4\ 8 \end{array} \quad 1,274 \times 2$ <p><i>Then multiply 1,274 by 30.</i></p> $\begin{array}{r} 1\ 2\ 7\ 4 \\ \times \quad 3\ 2 \\ \hline 2\ 5\ 4\ 8 \quad 1,274 \times 2 \\ 3\ 8\ 2\ 2\ 0 \quad 1,274 \times 30 \\ \hline \end{array}$ <p><i>Finally, find the total.</i></p> $\begin{array}{r} 1\ 2\ 7\ 4 \\ \times \quad 3\ 2 \\ \hline 2\ 5\ 4\ 8 \quad 1,274 \times 2 \\ 3\ 8\ 2\ 2\ 0 \quad 1,274 \times 30 \\ \hline 4\ 0\ 7\ 6\ 8 \quad 1,274 \times 32 \end{array}$ <p style="text-align: center;">$1,274 \times 32 = 40,768$</p>
--	--	--	---

Multiplying decimals by 10, 100 and 1,000

Use place value equipment to explore and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths.

Represent multiplication by 10 as exchange on a place value grid.

$0.14 \times 10 = 1.4$

Understand how this exchange is represented on a place value chart.

Th	H	T	O	.	Tth
			2	.	5
		2	5	.	
	2	5	0	.	
2	5	0	0	.	

$2.5 \times 10 = 25$
 $2.5 \times 100 = 250$
 $2.5 \times 1,000 = 2,500$

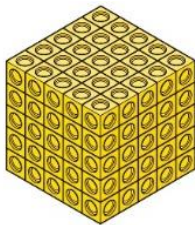
Year 6

	Concrete	Pictorial	Abstract
Year 6 Multiplication			
Multiplying up to a 4-digit number by a single digit number	<p>Use equipment to explore multiplications.</p> <p>4 groups of 2,345</p> <p>This is a multiplication:</p> $4 \times 2,345$ $2,345 \times 4$	<p>Use place value equipment to compare methods.</p> <p>Method 1</p> <p>Method 2</p> $4 \times 3,000 + 4 \times 200 + 4 \times 20 + 4 \times 5 = 12,900$	<p>Understand area model and short multiplication.</p> <p>Compare and select appropriate methods for specific multiplications.</p> <p>Method 3</p> $12,000 + 800 + 80 + 20 = 12,900$ <p>Method 4</p>
Multiplying up to a 4-digit number by a 2-digit number		<p>Use an area model alongside written multiplication.</p> $4,200 + 630 + 105 = 4,935$	<p>Use compact column multiplication with understanding of place value at all stages.</p>

		2	3	5	
	x		2	1	
				5	1 × 5
			3	0	1 × 30
		2	0	0	1 × 200
		1	0	0	20 × 5
		6	0	0	20 × 30
	4	0	0	0	20 × 300
	4	9	3	5	21 × 235

Using knowledge of factors and partitions to compare methods for multiplications

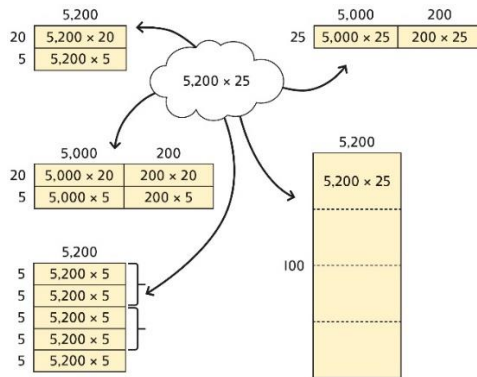
Use equipment to understand square numbers and cube numbers.



$$5 \times 5 = 5^2 = 25$$

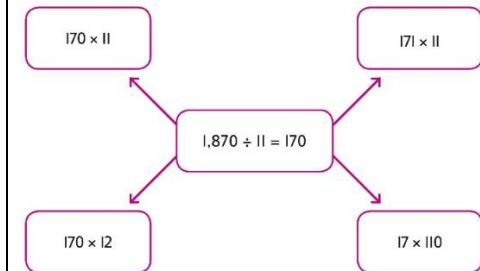
$$5 \times 5 \times 5 = 5^3 = 25 \times 5 = 125$$

Compare methods visually using an area model. Understand that multiple approaches will produce the same answer if completed accurately.



Represent and compare methods using a bar model.

Use a known fact to generate families of related facts.



Use factors to calculate efficiently.

$$15 \times 16$$

$$= 3 \times 5 \times 2 \times 8$$

$$= 3 \times 8 \times 2 \times 5$$

$$= 24 \times 10$$

$$= 240$$

Multiplying by 10, 100 and 1,000

Use place value equipment to explore exchange in decimal multiplication.

Understand how the exchange affects decimal numbers on a place value grid.

Use knowledge of multiplying by 10, 100 and 1,000 to multiply by multiples of 10, 100 and 1,000.

$$8 \times 100 = 800$$

$$8 \times 300 = 800 \times 3$$

$$= 2,400$$

T	O	.	Tth
		.	30

Represent 0.3.

T	O	.	Tth
		.	30

Multiply by 10.

T	O	.	Tth
3		.	

Exchange each group of ten tenths.

$0.3 \times 10 = ?$
 0.3 is 3 tenths.
 10×3 tenths are 30 tenths.
 30 tenths are equivalent to 3 ones.

T	O	.	Tth
3		.	

$0.3 \times 10 = 3$

T	O	.	Tth
	3	.	3

T	O	.	Tth
	3	.	3

T	O	.	Tth
3		.	

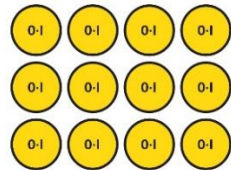
$$2.5 \times 10 = 25$$

$$2.5 \times 20 = 2.5 \times 10 \times 2$$

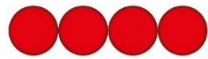
$$= 50$$

Multiplying decimals

Explore decimal multiplications using place value equipment and in the context of measures.



3 groups of 4 tenths is 12 tenths.
 4 groups of 3 tenths is 12 tenths.



←→ 1.3 cm ←→ 1.3 cm ←→ 1.3 cm ←→ 1.3 cm

$$4 \times 1 \text{ cm} = 4 \text{ cm}$$

$$4 \times 0.3 \text{ cm} = 1.2 \text{ cm}$$

$$4 \times 1.3 = 4 + 1.2 = 5.2 \text{ cm}$$

Represent calculations on a place value grid.

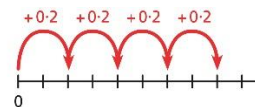
$$3 \times 3 = 9$$

$$3 \times 0.3 = 0.9$$

T	O	.	Tth
		.	9

Understand the link between multiplying decimals and repeated addition.

T	O	.	Tth
		.	9



Use known facts to multiply decimals.

$$4 \times 3 = 12$$

$$4 \times 0.3 = 1.2$$

$$4 \times 0.03 = 0.12$$

$$20 \times 5 = 100$$

$$20 \times 0.5 = 10$$

$$20 \times 0.05 = 1$$

Find families of facts from a known multiplication.

I know that $18 \times 4 = 72$.

This can help me work out:

$$1.8 \times 4 = ?$$

$$18 \times 0.4 = ?$$

$$180 \times 0.4 = ?$$

$$18 \times 0.04 = ?$$

Use a place value grid to understand the effects of multiplying decimals.

			<table border="1"> <thead> <tr> <th></th> <th>H</th> <th>T</th> <th>O</th> <th>•</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td>2×3</td> <td></td> <td></td> <td>6</td> <td>•</td> <td></td> <td></td> </tr> <tr> <td>0.2×3</td> <td></td> <td></td> <td>0</td> <td>•</td> <td>6</td> <td></td> </tr> <tr> <td>0.02×3</td> <td></td> <td></td> <td></td> <td>•</td> <td></td> <td></td> </tr> </tbody> </table>		H	T	O	•	Tth	Hth	2×3			6	•			0.2×3			0	•	6		0.02×3				•		
	H	T	O	•	Tth	Hth																									
2×3			6	•																											
0.2×3			0	•	6																										
0.02×3				•																											